AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A drug delivery system capable of delivering an effective amount of a drug to a subject, comprising:

a delivery pump having a chamber capable of housing at least one drug;

a delivery conduit connected to the pump and adapted to extend into a tissue site in the subject, the delivery conduit being effective to deliver the drug from a distal end thereof to the tissue site;

a sensor, implantable within a subject, and capable of providing ~~a~~ sensor output signals representative of sensed biochemical parameters; and

a control unit in communication with the sensor and the pump and effective to ~~receive and~~ compile and store a database of the sensor output signals, and to communicate a delivery signal that is continuously adjusted based on the database of sensor output signals to the pump to deliver the drug at a rate and for a duration effective to achieve a desired biochemical parameter within a predetermined range.

2. (Original) The drug delivery system of claim 1, wherein the sensor includes an optical fiber, and the sensor output signal is a spectral output signal.

3. (Original) The drug delivery system of claim 1, wherein the sensor includes an electrochemical sensor, and the sensor output signal is an electrical signal or characteristic.

4. (Original) The drug delivery system of claim 1, wherein the drug is selected from among the group of drugs consisting of a pain killer, a chemotherapeutic agent, a neuroprotectant, a neurologically active material, an agonist to a neurologically active material, an antagonist to a neurologically active material, and combinations thereof.

5. (Original) The drug delivery system of claim 1, wherein the control unit comprises a processor operative to monitor and store dose-response information.

6. (Original) The drug delivery system of claim 1, wherein both the delivery conduit and the sensor are adapted to be implanted in the central nervous system, and the sensor measures a biochemical parameter indicative of drug delivery.

7. (Previously Presented) The drug delivery system of claim 1, wherein the sensor is implanted in the subject at a location remote from location of the distal end of the delivery conduit.

8. (Original) The drug delivery system of claim 1, wherein the delivery conduit is selected from the group consisting of a catheter, a needle, and a porous fiber.

9. (Original) The drug delivery system of claim 2, wherein the optical fiber is adapted to be implanted directly in nervous system tissue, and a portion of the optical fiber includes a bioactive chromophore effective to absorb or bind to an analyte of interest to alter color or saturation such that the return light from the fiber provides spectral data indicative of the local presence or concentration of the analyte of interest.

10. (Original) The drug delivery system of claim 9, wherein the analyte of interest is a neurotransmitter.

11. (Original) The drug delivery system of claim 2, wherein the sensor includes an array of optical fibers adapted to be implanted directly into nervous system tissue, such that the return light from the array of optical fibers provides spectral data locally indicating tissue distribution of a probed analyte or tissue state.

12. (Original) The drug delivery system of claim 1, wherein the sensor responds to a drug-related material selected from among the group consisting of a chemical, an ion, a biological molecule, a gas, and combinations or spectral indications thereof.

13. (Original) The drug delivery system of claim 2, wherein the sensor includes an enzyme immobilized at a sensing surface.

14. (Currently Amended) A method of drug treatment, comprising the steps of:

providing an infusion pump implantable at a site in a subject, wherein the pump includes a housing having a chamber for containing one or more drugs and being operable to deliver the drug from the infusion pump;

providing a delivery pathway from the infusion pump to a target tissue site within the subject; and

providing a sensor configured for implantation at a sensing location in the subject, wherein the sensor is adapted to detect a biochemical parameter or event at the sensing location and to produce an output signal indicative thereof; and

providing a control unit, implantable at a site in a subject, wherein the control unit is able to receive the output signal from the sensor and wherein the control unit is in communication with the infusion pump;

wherein the control unit controls drug delivery from the infusion pump, responding to data provided by the output signal in a closed loop feedback cycle to regulate delivery of the drug from the infusion pump so as to release the drug at the target site to maintain the sensed biochemical parameter or event within a predetermined range; and

wherein the control unit includes a processor and a memory, and the processor compiles and stores a database of sensed data and response data, and responds to the compiled and stored data to create and adjust a treatment model.

15. (Original) The method of claim 14, wherein the step of providing a sensor includes providing an optical or electrochemical sensor.

16. (Canceled).

17. (Original) The method of claim 14, wherein the control unit is contained within or is separate from the infusion pump.

18. (Original) The method of claim 17, wherein drug delivery is timed to synchronize with periods within the subject's Circadian rhythm.

19. (Original) The method of claim 18, wherein drug delivery is preprogrammed to synchronize with periods within the subject's Circadian Rhythm.

20. (Previously Presented) A method for delivering an effective amount of a drug to a subject, comprising:

sensing one or more biochemical parameters in a subject in response to the delivery of a drug to produce sensed signals;

creating a dose-response database from the sensed signals;

modeling appropriate pump control parameters for maintaining desired conditions based on the dose-response database;

delivering a drug to a subject from a drug delivering pump operated under the appropriate pump control parameters; and

repeating the step of sensing one or more biochemical parameters to modify the dose-response database and to model appropriate pump control parameters.